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Date:	22-Sept-2021
Subject:	Source of metal contamination increase downstream of the Helvetia Mining District at Sahuarita Road

SUMMARY

One of the key parameters in determining whether the ephemeral washes on Rosemont Copper World Project (Project) site's private land are considered jurisdictional under the Clean Water Act is whether there is a "significant nexus" with a downstream "traditionally navigable water" (TNW). In other words, the washes on private land could be determined to be jurisdictional waters if they have a physical, biological, and chemical connection to a downstream TNW. The purpose of this memorandum is to explain the increase in metal concentrations where a small wash downstream of the Helvetia Mining District crosses under Sahuarita Road. The Helvetia Mining District is over 10 air miles southeast of the sample point and includes Copper World, the Columbia Smelter, and the Tip Top Mine.

Westland Resources and Hudbay Minerals collected sediment samples for a Connectivity Study to determine if and how far sediments were carried downstream the Project site by stormwater in the ephemeral drainages. Sampling began at potential chemical sources (the Columbia Smelter, Tip Top Mine, and downstream of a marble quarry) and continued at various intervals downstream to the point D1-19, over 10 air miles northwest of the Helvetia Mining District. D1-19 point is located on a side channel near a housing development just north of Sahuarita Road and a few hundred feet east of the intersection of Delgado Road.

Geochemical analysis of sediments yielded decreased metal concentrations with increased distance from the Helvetia Mining District; however metal values increased again at point D1-19 where the wash crossed under the Sahuarita Road a few hundred feet east of the intersection of Delgado Road (Beggy, 2021).

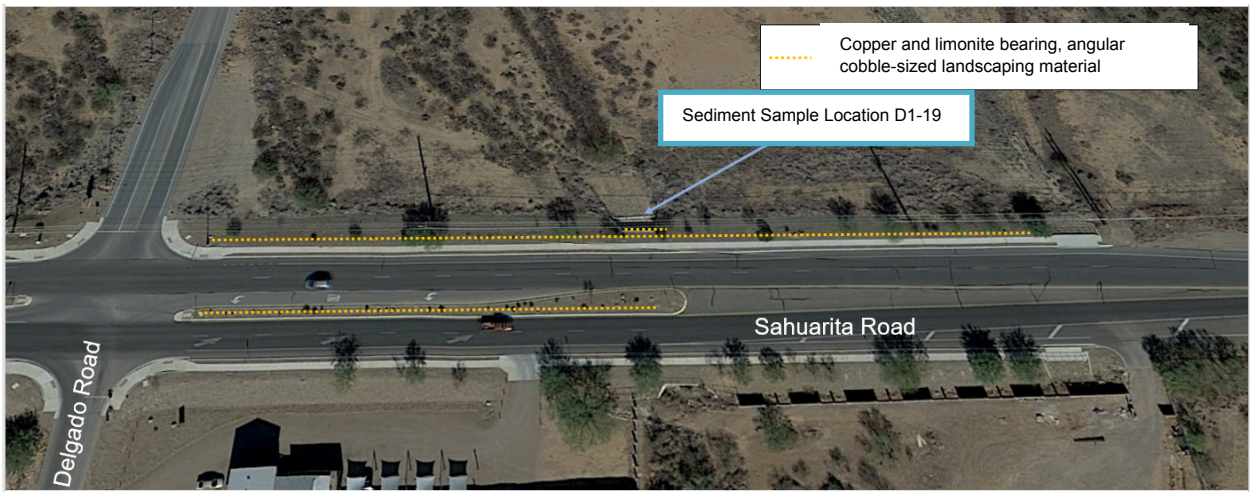

Figure 1: Sample Location and proximal areas likely contributing to higher local metal concentrations.

Several rock samples were collected from the landscaping material used to fill the banks surrounding the concrete culvert and inlet outside the culvert. The rocks are a mix of clastic sedimentary and meta-sedimentary rocks, angular to subangular, cobble size or larger, the majority with conspicuous limonite (iron-oxides), green copper oxides, and/or black oxides. Some of the limonite appears to be from oxidation of sulphide minerals.

For additional verification, the culvert site was revisited on September 21st, 2021. It was confirmed that the rocks collected previously were the same as used in the landscaping material. The same material forms a median on the highway over 300' length, as well as parallel to the sidewalk for over 500' feet in length.

It can be reasonably surmised that the landscaping material was sourced from one of the local open pit copper mines, likely from a waste rock or stockpile location.

It is very reasonable, and likely, the landscaping material releases some metals during rain events, and the landscaping material and run-off water from the roadway is the source of metal concentration increase. The other samples further upstream with lower values indicate the Helvetia Mining District is a negligible source of metal concentrations at this sample location.

Figure 2: Rocks from culvert fill. Conspicuous green copper oxides and dark brown limonite present.

Figure 3: Similar rocks are found over 500’ length on either side of the sidewalk on both sides of the culvert. Photo is looking west, taken about 100’ east of the culvert.

Figure 4: Close up of rocks at culvert. Dark brown limonite on the rock on the right interpreted to be oxidized sulphides.

Figure 5: Additional photos of rocks along sides of the sidewalk.

Figure 6: Photo of site on the sampling date looking upstream. Note the rock material both above and downstream the culvert.

Figure 7: Photo of the site on the sampling date looking downstream.

References:

Beggy, H., 2021, Connectivity Report for Rosemont Copper World Project